

Application 10/733,534
Preliminary amendment dated September 15, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

THE INVENTION CLAIMED IS:

1. (original) A method of extracting a non-denatured protein comprising the steps of:
 - a. adsorbing a non-denatured protein to the extraction surface of an extraction channel under non-denaturing conditions, and
 - b. eluting the non-denatured protein under non-denaturing conditions by passing a desorption solvent through the channel.
2. (original) The method of claim 1, wherein the eluted non-denatured protein is used in a process that requires that the protein be non-denatured for the process to be successful.
3. (original) The method of claim 2, wherein the process is an analytical method.
4. (currently amended) The method of claim 3, wherein the analytical method is selected from a binding study, an activity assay, an enzyme assay, SPR surface plasmon resonance, electron microscopy, mass spectroscopy, X-ray crystallography and NMR.
5. (original) The method of claim 2, wherein the process is protein crystallization.
6. (original) The method of claim 1, wherein the method does not involve the introduction of joule heating to the non-denatured protein.
7. (original) The method of claim 1, wherein the extraction is performed in between 1 and 20 minutes.
8. (original) The method of claim 1, wherein the extraction is performed at a temperature in the range of 0°C to 25°C.
9. (original) The method of claim 1, wherein the eluted protein retains its function.
10. (original) The method of claim 1, wherein the eluted protein is in its native state.
11. (original) A method of preparing a native protein comprising the steps of:

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- a. adsorbing a protein to the extraction surface of an extraction channel under conditions that do not irreversibly denature the protein, and
 - b. eluting the protein under conditions that do not irreversibly denature the protein by passing a desorption solvent through the channel;
 - c. optionally re-naturing the eluted protein if the protein has been reversibly denatured; and
 - d. recovering the native protein.
- 12-13. cancelled
14. (currently amended) A method for extracting a multi-protein complex comprising the steps of:
- a. introducing a sample solution comprising an multi-protein complex into an extraction channel, said multi-protein complex comprising a first and second protein, said extraction channel comprising an extraction surface that binds said ~~analyte~~ multi-protein complex, whereby said multi-protein complex is adsorbed to said extraction surface;
 - b. passing a first desorption solution through the channel, thereby eluting said first protein.
15. (currently amended) The method of claim 14, wherein the channel is purged with a gas between steps (a) and (b), so that said extraction channel is substantially free of bulk liquid.
16. (original) The method of claim 15, wherein said extraction surface remains substantially solvated after the purging step.
17. (original) The method of claim 14, wherein a wash solution is passed through the channel between steps (a) and (b).
18. (original) The method of claim 14, wherein said second protein remains adsorbed to said extraction surface.
19. (original) The method of claim 14, wherein the entire multi-protein complex is eluted.
20. (original) The method of claim 18, wherein after step (b) a second desorption solution is

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- passed through the extraction channel, thereby eluting said second protein.
21. (original) The method of claim 20, wherein said protein complex further comprises a third protein, and wherein after elution of said second protein a third desorption solution is passed through the extraction channel, thereby eluting said third protein.
22. (currently amended) The method of claim 19, wherein the first desorption solution does dissociate the multi-protein complex.
23. (original) The method of claim 20, wherein the first and second desorption solutions differ in at least one of the following parameters: pH, ionic composition, ionic strength, and solvent polarity.
24. (original) The method of claim 20, wherein at least one of the desorption solutions contains an agent that effects protein-protein interactions.
25. (original) The method of claim 24, wherein the agent is selected from urea, guanidinium chloride and isothiocyanate.
26. (original) The method of claim 14, wherein the multi-protein complex comprises a recombinant bait protein.
27. (original) The method of claim 26, wherein said recombinant bait protein comprises a fusion tag.
28. (original) The method of claim 14, wherein a step elution is performed.
29. (currently amended) A method for extracting a multi-protein complex comprising the steps of:
- a. introducing a sample solution comprising ~~an a~~ first protein into an extraction channel, ~~said extraction channel comprising an extraction surface that binds said analyte~~ first protein, whereby said first protein ~~complex~~ is adsorbed to said extraction surface;
 - b. passing a second protein through said extraction channel, whereby said second protein binds to said ~~second~~ first protein to form a multi-protein complex;
 - c. passing a desorption solution through the channel, thereby eluting said second protein.

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30. (currently amended) The method of claim 29, wherein said first ~~and second proteins are~~ protein is additionally eluted in step (c).
31. (currently amended) The method of claim ~~31~~ 30, wherein said first and second proteins are eluted as a multi-protein complex.
32. (original) The method of claim 29, wherein said first protein comprises a fusion tag.
33. (original) The method of claim 32, wherein said fusion tag is a poly-histidine tag.
34. (original) The method of claim 29, wherein said eluted second protein is non-denatured.
35. (currently amended) The method of claim 1, wherein the channel is purged with a gas between steps (a) and (b), so that said extraction channel is substantially free of bulk liquid.
36. (original) The method of claim 35, wherein said extraction surface remains substantially solvated after the purging step.
37. (original) The method of claim 1, wherein a wash solution is passed through the channel between steps (a) and (b).
38. (new) The method of claim 29, wherein the channel is purged with a gas between steps (a) and (b), so that said extraction channel is substantially free of bulk liquid.
39. (new) The method of claim 38, wherein said extraction surface remains substantially solvated after the purging step.
40. (new) The method of claim 29, wherein a wash solution is passed through the channel between steps (a) and (b).